Safety Science, Volume 86, July 2016, Pages 110–121

Safety Leadership Practices for Organizational Safety Compliance: Developing a research agenda from a review of the literature.

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Abstract

Safety leadership is asserted to positively influence safety compliance amongst employees. We examine this assertion by conducting a systematic literature review of the available academic literature on safety leadership practices and observed safety outcomes. We identified 25 empirical studies, the majority of which measured leadership through generic scales (MLQ and LMX). Closer scrutiny of the outcome measures suggested that these were mainly aligned to the implementation and operations phases of the OHSAS 18001 safety management systems framework. We conclude that safety compliance has been narrowly defined in academic study, but in practice embraces a much wider range of activities. While safety leadership may contribute to successfully achieving these other actions, there is no empirical evidence for this. Moreover, there is considerable critique of transformational and transactional leadership, so that the specification of desired leadership practices is problematic. We propose that a broader conceptualization of safety compliance requires safety leadership to embrace 'plural' forms of leadership. We draw attention to the narrow range of contexts in which safety leadership has been empirically studied and suggests other settings for investigation. Alternative methods for investigating safety leadership other than scales of leadership behaviour are suggested to enrich our understanding of safety leadership and so improve safety compliance.

Keywords: Leadership; Compliance; Regulated Environments; Self-Regulation; Safety participation

1. INTRODUCTION

Leadership is an activity (Raelin, 2011) that varies depending upon the context (Denis et al., 2010), although this is frequently ignored despite calls for greater attention to be given to the context within which leadership is enacted (Osborn et al., 2002; Porter and McLaughlin, 2006). Studies of safety leadership however have focused on the style or behaviour (often transactional or transformational) of the leader rather than on the activities and practices that constitute leadership. Moreover, they fail also to account for the influence of context on these practices, following the pattern of the wider leadership literature. For example a recent meta-analysis of safety leadership styles as antecedents of safety behaviours (Clarke, 2013) took no account of context and how this might influence choice of styles or required behaviours. Conchie et al. (2013) noted this lack of research on the impact of context on leadership, using it to justify their study of supervisors' engagement with safety leadership.

In the UK an organization's safety environment is replete with legal requirements, stemming from the Health and Safety at Work etc. Act (1974), safety standards (e.g. BSI, 2004), guidance on safety practices from the Health and Safety Executive (e.g. HSE, 2013) and specific approved codes of practice (ACOPs). In addition to these nationally mandated frameworks are voluntary codes which can be equally compelling (Rocha, 2010). One of these – OHSAS 18001 (BSI, 2007) "has gained de facto international standard status, p.232" (Gallagher and Underhill, 2012) following widespread adoption in more than 50k companies in 100 countries (Hasle and Zwetsloot, 2011). This provides a global benchmark for safety practices in organizations and we use it here to permit comparison of studies from different regulatory contexts. Safety "regulations" such as these are an integral component of the external environment and a key aspect of the safety leader's role is to ensure their organization is compliant with them. Members of the top management team have a legal responsibility to ensure their organization's safety management systems (broadly defined) are compliant with these regulations. However, the content of these systems is extensive ranging from risk assessment and hazard identification to evaluating compliance against organizational policies and practices, and also including training, operational control and emergency preparedness (e.g. HSE, 1997). Achieving compliance with all of these different requirements is a challenging task for the safety leader(s) demanding the adoption of a range of different practices. Practices to ensure organizational safety compliance therefore appear to encompass much more than those specified in the narrow definition of safety compliance provided by Neal et al. (2000, pg. 101), namely "adhering to safety procedures and carrying out work in a safe manner", and regularly rehearsed in subsequent studies of safety leadership. Achieving organizational safety compliance, broadly understood, would require differential leadership responses depending on a combination of the nature and object of the regulation; the role or position of the leader; and the role and position of the employees required to comply; as well as their perceptions of risk; and the wider organizational context.

The aim of this paper is therefore to examine empirical studies published in academic journals to discover the extent to which the reported practices of individuals ascribed as safety leaders ensure organizational compliance with this wider range of safety requirements voluntarily demanded of organizations through adherence to OHSAS 18001 and to develop a research agenda to investigate the opportunities revealed by this wider view. Specifically, this paper has three objectives. First, it will identify practices aimed at ensuring organizational safety compliance enacted by those deemed to be safety leaders in organizations. This will be achieved by revealing the implicit practices of safety leaders inherent in existing individual behavioural measures used in current studies and aligning them to the appropriate elements of the OHSAS 18001 framework. Second, drawing on selected reviews of the wider leadership literature we will suggest how a newer conceptualization of leadership, namely distributed leadership, may engender a different form of compliance by employees that may support organizational safety compliance. Rather than relying on the traditional psychological approaches to understanding individual behaviours and motivations and personal characteristics of individual leaders in relation to safety, we draw on more relational and practice-based perspectives from sociology (Emirbayer, 1997; Nicolini, 2013) to present an alternative approach to safety leadership to support organizational safety compliance. Third, we will develop an agenda for safety leadership research, by identifying opportunities that arise from deficiencies in current research.

The paper is structured as follows. Following the systematic literature review methodology outlined for management and business studies by Tranfield et al. (2003) we first conduct a scoping study that provides an overview of current perspectives on safety leadership, the subjective nature of risk and motivations for compliance. The method deployed to conduct a more focused systematic literature review to elicit studies of safety leadership roles and practices is then described. The descriptive analysis (or findings) of the review reports the practices enacted by safety leaders to achieve organizational compliance. It also provides an analysis of the different empirical contexts in which safety leadership has been investigated. This is followed by a discussion of the thematic findings arising from the review. These report the current state of knowledge in the field and also what is not known by identifying limitations of existing work and opportunities for further research.

2. SCOPING STUDY OVERVIEW

2.1 Safety Leadership

According to the HSE sponsored literature review of effective leadership behaviours for safety (Lekka and Healey, 2012) existing safety leadership research published in a variety of academic journals, books and policy documents has focused on either transformational-transactional leadership or leader-member exchange (LMX).

Transformational leadership may be defined as "leader behaviours that transform and inspire followers to perform beyond expectations while transcending self-interest for the good of the organization" (Avolio et al., 2009; pg 423). Transformational leadership comprises four leader behaviours (Bass, 1985) namely; idealized influence, inspirational motivation, intellectual stimulation and individual consideration and is characterized by value-based and individualized interaction, which results in better exchange quality and greater concern for welfare (Clarke, 2013). ***Idealized influence*** is based on trust and occurs when leaders demonstrate high standards of moral conduct in their own behaviour, becoming role models for their subordinates. ***Inspirational motivation*** occurs when leaders provide clarity, communicate a positive value-based vision for the future state of the organization and its employees and challenge employees to go beyond their personal interests and focus their attention on the goals of the collective. Leaders exhibit ***intellectual stimulation*** when they encourage employees to share their perspectives on issues, to challenge organizational norms, question assumptions and to think creatively. Leaders draw on a variety of opinions in order to make decisions. Leaders displaying ***individual consideration*** recognize the unique needs and abilities of the followers and by adapting their approach seek to coach or mentor them in order that they might reach their full potential. Each of these four dimensions of transformational leadership has implications for safety leadership (see Kapp, 2012 or Hoffmeister et al., 2014).

In contrast, transactional leadership is based on non-individualized hierarchical relationships and comprises three dimensions (constructive leadership, corrective leadership and laissez-faire leadership) (Zohar, 2002a). ***Constructive leadership*** offers material rewards (e.g. increased salary, promotion, job security) contingent upon satisfactory performance. This requires clear communication between leader and follower. Some understanding of the individual needs and abilities is needed in order to offer motivationally relevant rewards. ***Corrective leadership*** (or active management by exception) monitors individual performance against standards, detecting errors and correcting them. ***Laissez-faire leadership*** (passive management by exceptions) disowns all leadership responsibility and only engages with subordinates in an emergency.

In adopting a transactional leadership style for safety, leaders typically establish appropriate safety goals, monitor performance towards these goals and reward behaviours that sustain or improve safety practices (Kapp, 2012; Zohar 2002a, 2002b). By contrast, leaders adopting a transformational leadership style for safety demonstrate 10 different actions, as outlined in Kelloway et al. (2006). These include: expressing satisfaction when jobs are performed safely; rewarding achievement of safety targets; continuous encouragement for safe working; maintaining a safe working environment; suggesting new ways of working more safely; encouraging employees to openly discuss safety at work; talking about personal value and beliefs in the importance of safety; behaving in a way that demonstrates commitment to safety; spending time to demonstrate how to work safely; and, listening

to safety concerns. Both transformational and transactional leadership styles are often assessed by subordinates completing the MLQ survey developed by Bass and Avolio (2002) and adapted to focus on safety (e.g. Barling et al., 2002). This reported the employees' perceptions of the leadership behaviours of their supervisors, for example "spends time showing me the safest way to do things, pg. 141" (Conchie and Donald, 2009).

LMX focuses on the dyadic social exchange processes between leader and follower, acknowledging that leaders develop different exchange relationships with their followers thereby differentially impacting important leader and member outcomes (Graen and Uhl-Bien, 1995). In dyadic relationships, the early social exchanges (essentially between strangers or acquaintances) which are more 'transactional' in nature, change to become more 'transformational' as the relationship develops into a partnership (Graen and Uhl-Bien, 1995). Thus low LMX relationships align more closely with descriptions of transactional leadership while high LMX relationships align more closely with the descriptions of transformational leadership (Graen and Uhl-Bien, 1995). Leadership occurs when leaders and followers develop effective relationships based on trust, respect and mutual obligations, resulting in mutual and incremental influence to meet shared interests (Uhl-Bien, 2006). Safety studies adopting this perspective (e.g. Hofmann and Morgeson, 1999; Yagil and Luria, 2010) investigated relationship quality using the 7-point LMX scale (Graen and Uhl-Bien, 1995) relying on practices implicit within the scales that constitute trust, respect and obligation. These are giving feedback, problem solving, providing personal support, decision making, providing direction and clarity, which strongly resemble aspects of both transactional and transformational leadership.

2.2 Variation in understanding risk

Krimsky and Golding (1992) drew attention to ontologically different perspectives on risk. The dominant one, adopted typically by safety engineers, is agent-centred and based on "a model of rationality that is fixed and invariant" (Tansey, 2004; pg 18), this renders safety and safety compliance amenable to traditional scientific methods and standards. An alternative draws on structural-cultural approaches that emphasize the contextual, situated and socially-constructed nature of risk, risk perceptions and therefore safety (Tansey, 2004). Likewise, Hutter (2011, pg 305) acknowledged the "situated and negotiated character of regulatory compliance", so that compliance with what, by whom and for what purpose is not clear cut. Regulation and safety compliance is therefore fraught with dilemmas and conflicts as different groups have different perspectives on what the particular risks are and what is required to mitigate them. Hutter (2011) draws on her earlier investigation of British Rail to note the differences in perspective on risk between senior managers who had learned about risks through reports and safety data, and employees who had little knowledge of risk but understood very well through experience and anecdote the nature of accidents and their causes in their workplace. As a consequence these two groups would have different motivations to

comply and capability to do so. While board members or senior managers may have engaged with a regulator, middle managers, supervisors and front-line workers are unlikely to have had that experience. Indeed even board members and senior managers may not have met a regulator because most organizations are never inspected (Gray and Silbey, 2011). Knowledge and understanding of safety compliance requirements will therefore vary across the organizational hierarchy, so that who is trying to comply with what and how this is to be achieved cannot be assumed and needs to be made explicit.

2.3 Achieving compliance

Organizational safety compliance demands that organizations meet legal or regulatory safety requirements that are enacted by safety leaders in the organization who establish practices and procedures for others to follow. Organizational safety compliance is consequently built on individual safety compliance through the agency of the leader and the practices that they enact. Achieving compliance therefore depends not only on the knowledge, understanding and skill of the individuals (Gray and Silbey, 2011) but also on individual motivation (Tyler, 2011), which may be either extrinsic or intrinsic (Ryan and Deci, 2000). Extrinsic motivation to achieve compliance draws on an individual's instrumental concerns and their utility maximization goals, and is often achieved through either fear of punishment or anticipation of reward (Tyler, 2006), which may be tangible, for example financial, or intangible, for example praise. Leadership practices associated with a transactional style typically adopt this 'command-or-control' form of regulation to ensure compliance in general, and safety compliance in particular and may be evident in the production of standard operating procedures and accompanying check-lists for audit purposes. In contrast, self-regulation depends on the internalization of social norms and values which drives individual behaviours (Tyler, 2006). Intrinsic motivation is where the individual desires to conform, or comply, through a sense of obligation or feelings of morality (Tyler, 2006). These can be encouraged and developed by establishing the legitimacy of the rules or the authority figure, where 'legitimacy refers to the judgement that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definition' (Suchman, 1995; pg. 574). A transformational leadership style characterized by value-based and individual interaction, seeks to establish the legitimacy of the leader and their demands by appealing to the values of the individual. Individuals who voluntarily participate in organizational activities demonstrate intrinsic motivation indicating compliance with expected norms. Leaders may provide forums for discussion to encourage participation.

This brief overview of the literature suggests that safety leadership behaviours may be either transformational or transactional drawing respectively on intrinsic motivation which encourages voluntary rule following out of obligation to the leader, and the organization they represent, or extrinsic motivations, which establishes control through fear of punishment or anticipation of reward.

In the literature these are presented as discrete alternatives that achieve safety compliance through different practices. However, it is unclear in which circumstances either applies, even though we know that motivations and ability to comply vary amongst individuals employed in different roles as does their understanding and knowledge of compliance requirements. Furthermore this assumes that both transformational and transactional leadership are singular constructs, when clearly they are multi-dimensional (Yukl, 1999). Consequently it is unclear whether particular aspects of leadership practice encourage specific sorts of compliance, and if so which. For example how do the corrective and constructive dimensions of transactional leadership differ in the ways they deliver compliance with standard procedures? And, what difference would an employee experience if their transformational leader adopted individual consideration rather than inspirational motivation to ensure more individuals were involved in safety planning? Although Griffin and Hu (2013; pg. 197) argued that "more empirical studies are required to understand how safety leaders can promote safety compliance", we believe that a closer inspection of existing safety leadership studies taking account of their contextual differences will reveal more about the practices by which safety leaders achieve organizational compliance with the wide variety of safety requirements noted above. This may be achieved through a focused systematic literature review to investigate the question: what leadership practices are enacted to assure organizational safety compliance?

3. METHOD OF SYSTEMATIC LITERATURE REVIEW

The systematic literature review methodology developed by Tranfield et al. (2003) was deployed to address the review question. A series of key words were developed in relation to the three primary terms of interest, namely, safety, leadership and practice (Table 1). These keywords were combined to make strings using the Boolean character 'OR' and different strings were combined using the Boolean character 'AND' (Table 2). These were applied to five different electronic databases (ABI-Proquest, EBSCO Host – Business Source Complete, SCOPUS, Science Direct and PsychInfo). Table 2 shows the numbers of items appearing in scholarly peer reviewed academic journals only in the different databases in relation to the different search string combinations. An initial screen of titles permitted a substantial reduction in apparently relevant articles (Table 2). Exclusion criteria included book reviews and non-English language articles, as well as those that focused on different forms of security (including cyber, food, financial, energy and national) and various forms of safety (including health and patient, environmental, technical, transport, chemical and product). Papers that dealt with modelling, families, education and business performance were also excluded. After removal of the duplicates occurring in each of the databases the number of articles from the string for 'safety + leadership + practice' was reduced from 113 to 55. The authors then reviewed these abstracts together to assure that they met the inclusion criteria, namely that the studies were empirical and considered identifiable practices of the safety leader. Through discussion 47 of these 55 articles were deemed to be not relevant because they failed to emphasize clearly both the leader and their practices.

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Keyword searching is not always a very effective method for finding relevant articles. Greenhalgh and Peacock (2005) in a study of search methods discovered less than 30% of relevant articles by protocol driven search strategies (i.e. keywords). Following their advice we not only scanned the reference lists of the remaining eight articles but also tracked their subsequent citations identifying a further 17 additional papers deemed to be relevant to the study of safety leadership practices for compliance. While many of these studies explicitly focused on particular relationships principally supervisor-employee relationships and considered specific contexts, what was required specifically and from whom, was often only mentioned in the methods section of each paper. A total of 25 articles were read and analysed; a number comparable to those found in other literature reviews in the safety field (e.g. a review of safety culture by Guldenmund (2000) drew on 21 papers, while another by Drupsteen and Guldenmund (2014) on learning from safety incidents, accidents and disasters drew on 44 articles).

From a study of 21 leading journals over a period of 16 years Porter and McLaughlin (2006) proposed seven categories of organizational context variables but noted that three-quarters of the empirical studies that they reviewed failed to mention any of them. In our extraction we were able to directly capture information on two of these categories: (i) the people and composition of the organization (including gender demographics and experience especially of the sampled population) and (ii) the structure of the organization (including size and type of organization and hierarchical levels). Indirectly, we captured information on (iii) culture and (iv) processes. Organizational culture was inferred by applying a simple framework developed by Denison and Spreitzer (1991). They juxtaposed the tension between stability and change and the tension between a focus on the internal organization and the external environment to give four ideal-types that reveal four different cultural orientations of organizations (a group culture, a developmental culture, a rational culture and a hierarchical culture), each with a particular focus and their own characteristics (Table 3). We used these descriptions to categorize the organizations in the papers we reviewed into one of these four ideal cultural types. We were unable to ascertain details of the last three of Porter and McLaughlin's seven categories (goals/purposes, state/condition or time).

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In addition we extracted the following information from each paper:

- Industry / sector;
- Focal actor(s) (*e.g.* manager, supervisor, front-line worker taking note of the leader);
- Focus of measure (*e.g.* consciousness, communication, compliance, risk management and participation) used to describe compliance (defined broadly); and
- Scale (where appropriate) used to indicate leadership. Many studies used the MLQ scale to indicate transformational-transactional leadership (Bass and Avolio, 2002), while Leader-Member exchange was indicated by the LMX scale. A few authors created their own leadership measures (e.g. Dahl and Olsen, 2013; Fernández-Muñiz et al. 2014; Lu and Yang, 2010).

By examining the items in the measures used to describe compliance (including for example safety voice and safety citizenship behaviour) it was possible to identify the practices that have been enacted by the leader to ensure safety. In their scale of safety citizenship behaviour Hofmann et al. (2003) noted 27 items. Many of these items indicate the existence of underpinning practices enacted by safety leaders such as establishing discussion forums, developing safety procedures and conducting risk assessment and identifying hazards, amongst others. Barling et al. (2002) in their scale of safety consciousness drew attention for example to the provision of safety resources (including PPE and fire extinguishers) and safety procedures (especially in the event of an injury), while Neal and Griffin (2006) indicated that providing safety equipment and developing safety procedures were a prerequisite for safety compliance. This process was repeated for each of the other papers. Fortunately, these three papers (Neal and Griffin (2006), Barling et al., (2002) and Hofmann et al. (2003)) provided measurement scales for 12 of the other papers. Having identified these (often implicit) practices in each of the papers, they were then aligned to the categories identified in the OHSAS 18001 standard (BSI, 2007) (Table 4). By way of illustration, the practices associated with Barling et al.'s safety consciousness scale were aligned to: 4.1 Resources; 4.2 Training; 4.3.1 Communication and 4.3.2 Participation; 4.6 Operational Control; 4.7 Emergency preparedness and response; and 5.3.1 Incident investigation, while those from Neal and Griffin were aligned to: 3.1 Risk assessment; 4.1 Resources; and 4.6 Operational Control. This allowed us to identify the actual breadth of leadership practices for assuring organizational safety compliance that was being considered in this collection of papers (Table 4).

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4. DESCRIPTIVE ANALYSIS

We identified 25 academic articles that explored the role and practices of safety leaders and provided details of their environmental context. Our review confirms the findings of the earlier review of

effective leadership behaviours for safety (Lekka and Healey, 2012) that current safety research focuses mainly on either transactional – transformational leadership (mainly through the MLQ scale) or leader-member exchange (LMX) (Table 5). Sixteen of the reviewed papers had this focus. By contrast, many of the remainder adopted qualitative approaches to data capture either exploring factors that influenced leadership enactment through focus groups (Conchie et al., 2013) or investigating the effects of supervisory feedback on worker safety compliance through brief interviews (Zohar, 2002b; Zohar and Luria, 2003).

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In contrast to the majority of studies which used generic scales, the work of Zohar and colleagues in Israel, focused on particular aspects of compliance, namely the use of PPE, specifically ear-plugs by workers, and safety communication, specifically the giving of feedback to workers by their supervisors (e.g. Zohar and Luria, 2003; Luria et al., 2008). In addition Conchie et al. (2013) investigated the influence of contextual factors, in particular role overload, production demands and formal procedures on supervisor enactment of leadership in the construction industry.

Leadership defined by the standard measures of MLQ or LMX (Table 5) was deemed in these reported studies to be an antecedent to several different safety behavioural outcomes, most commonly safety compliance and safety participation, although safety citizenship, including voice, and safety consciousness were also measured (Table 4). The measure for safety compliance developed by Neal and colleagues (Neal et al., 2000; Neal and Griffin, 2006) comprised four items. Dahl and Olsen (2013) and Fernández-Muñiz et al. (2014) supplemented these with other measures. Nevertheless together they only provide a partial coverage of the many activities required of leaders as outlined in the framework for OSH management systems (BSI, 2007) and against which compliance might be judged. Table 4 suggests that other measurement scales of safety behaviours indicate other practices that align with different elements of the OHSAS 18001 framework. This increases the scope of practices that leaders need to enact to ensure organizational safety compliance more broadly defined. However, no study has provided a complete investigation of all the elements and therefore underpinning practices of safety compliance identified in OHSAS 18001, although studies using the safety citizenship scale (Hofmann et al., 2003) and the bespoke scale of Fernández-Muñiz et al. (2014) come closest (Table 4). The focus was primarily on leadership practices that associated with implementation and operations, including facilitating communication, encouraging participation, providing resources, clarifying roles and training. Less attention has been focused on the activities associated with planning, such as risk assessment and hazard identification, and on checking including investigating both incidents and deviant behaviour. No attention has been given to the leadership practices associated with reviewing. The focus in these studies on supervisor-front-line worker

relationships (Table 5) may be a contributing factor, although this does ignore the responsibilities of more senior managers and their influence on organizational safety compliance.

Much of the research on safety leadership has been conducted in manufacturing, engineering and process industries (Table 5) which are commonly organized as hierarchies. Perhaps as a consequence many (n=17) of the studies have investigated explicitly supervisor-front-line worker relationships. Moreover, other studies (e.g. Hoffmeister et al., (2014) looking at journeymen-apprentice relationships, and Yagil and Luria (2010) looking at manager-employee) examined similar relationships between a low ranked worker and a higher ranked worker, leaving different and more senior relationships in the organizational hierarchy under-explored.

The inferred cultures of the investigated organizations were oriented predominantly towards stability with either an internal (hierarchical culture) or an external (rational culture) focus (Table 5). There is little evidence of studies of safety leadership conducted in organizations with cultures that focus on either innovation and creativity or the development of staff and the maintenance of group cohesion. For many studies it was inferred particularly from the context, that processes were standardized and governance arrangements were typically 'command and control' based on hierarchical relationships (Table 5).

Where the gender of the participants was identified, these were mainly males (Table 5). The exceptions were studies in hospitals (Mullen and Kelloway, 2009) and service organizations (Kelloway et al., 2006) in Canada. In many cases to the average age of the participant was between 35 and 45 years (Table 5), although there were a few studies including younger (Kelloway et al., 2006) and older (Hofmann and Morgeson, 1999) workers. Typically, the participants had been with the current employer for more than 5 years (Table 5), exceptions to this were found in studies by Barling et al. (2002) and Kelloway et al. (2006). Studies of safety leadership therefore have focused mainly on the responses provided by experienced middle-aged males.

In summary, we observe three things. First that safety leadership is investigated either as transformational-transactional leadership or LMX. Second that existing studies of safety compliance focus mainly on implementation and operations rather than broader aspects of compliance evident in OHSAS18001. Third that existing studies have been concentrated on a limited range of empirical contexts.

5. DISCUSSION OF THEMATIC FINDINGS

5.1 Safety Compliance

Complying with safety regulations requires attention to more than just operational practices which is the primary focus of many of the measures of safety compliance in the academic literature (e.g. Neal and Griffin, 2006) and indicated in Table 4. In the UK, the Health and Safety at Work etc Act (1974) covers: the provision and maintenance of plant and systems of work; the safe deployment of processes and practices; the provision of information, instruction and training; maintenance of a safe work place which implies attentiveness; the provision of necessary safety equipment to ensure the work environment is safe. These imply a range of activities as developed in various standards documents (e.g. BSI, 2007), including but not limited to planning and design, controlling, monitoring and evaluating, developing policy, process and procedure, and training. Although this larger compliance framework is UK-centric and directly applicable only to the studies by Conchie and her colleagues and by Clarke and her colleagues, nevertheless it is probable that safety legislation in other countries will have a similarly wide remit, so that safety compliance should be understood broadly. Indeed the OHSAS 18001 framework is recognized globally (Hasle and Zwetsloot, 2011). As a consequence, and in marked contrast to existing research studies, not only is the scope of safety compliance enlarged, but also a greater diversity of practices may contribute to its successful enactment.

5.2 Safety Leadership

One factor in particular, leadership, is often perceived to influence safety compliance. Hitherto most studies of safety leadership have adopted a transactional-transformational perspective (Table 5), either explicitly or implicitly, because the LMX perspective adopted by some "is both transactional and transformational: it begins as transactional social exchange and evolved into transformational social exchange" (Graen and Uhl-Bien, 1995, pg 238). This perspective draws on both the extrinsic and intrinsic motivation of individuals to achieve its effects, so that safety compliance in a 'command and control' form is achieved by transactional leadership which appeals to an individual's extrinsic motivation. Intrinsic motivations encourage self-regulation, and are supported by transformational leadership. One might conclude that different forms of safety leadership motivate individuals in different ways and these differentially impact the compliance of individuals with safety requirements. This individual compliance forms the basis of organizational safety compliance with mandated and voluntary safety requirements. Alternatively, individuals naturally differ in their inherent motivations to comply with safety requirements and the role of the safety leader is to modify his/her style to match these requirements to ensure individuals comply and support organizational safety compliance. What is much less clear, and yet altogether more practical, is how safety compliance may be achieved in specific circumstances and how this varies as context changes. The use of generic scales which incorporate both transactional and transformational leadership and by inference draw on both extrinsic and intrinsic motivations in safety questionnaires may contribute partially to this absence of clarity and lack of utility. In contrast the studies by Zohar and Luria (2003) and Luria et al. (2008) which

measured particular leader practices (supervisory feedback on safety) in relation to the use of PPE by workers have greater conceptual clarity and more obvious practical application.

5.3 Limitations of Existing Safety Leadership Studies

Many of the studies of transformational-transactional safety leadership have used the MLQ scale (Bass and Avolio, 2002), often selecting particular items, most notably the four items relating to transformational leadership plus contingent reward, a component of transactional leadership (e.g. Barling et al., 2002; Kapp, 2012). However the general concept of transformational leadership, and because it is a continuum transactional leadership also, has been the subject of severe critique both conceptually and methodologically (van Knippenberg and Sitkin, 2013). They draw attention to the failure to conceptually specify how the different dimensions combine to form transactional-transformational leadership and how separately they influence mediating processes. They also note that "current conceptualization and operationalization confounds leadership with its effects, p.2". Finally, they observe that the measurement tools most frequently used do not correspond to the dimensions specified by theory creating disconnects between theory and empirical evidence. Similarly, according to Yukl (1999) these critiques of transformational – transactional leadership "include ambiguous constructs, insufficient description of explanatory processes, a narrow focus on dyadic processes, omissions of some relevant behaviours, insufficient specification of limiting conditions (situational variables) and a bias towards heroic conceptions of leadership, pg. 286". These flaws are inevitably present in safety leadership studies because they use the same scales and this may account for contradictory findings between studies. For example Fernández-Muñiz et al. (2014) find that transformational leadership is related to safety compliance whereas Innes et al. (2010) do not. Future studies of safety leadership should seek to ensure greater conceptual clarity in the dimensions of the leadership construct under investigation and in their relationships to each other. Moreover, it is important that the explanatory processes linking leadership characteristics to follower outcomes are made explicit and are unambiguous. For example in the studies of safety leadership that use LMX (e.g. Credo et al., 2010; Kath et al., 2010) perceived organizational support (POS) (Eisenberger, et al., 1986) is additionally used to explain the safety outcomes, yet it is unclear how the leader does or does not also contribute to providing organizational support and whether the two constructs (leadership and POS) are conflated and to what extent. As a consequence it is unclear what specifically individual safety leaders do when they are leading for safety. Moreover the mechanisms are poorly understood by which their actions stimulate safety compliance either with the narrow range of activities embraced in academic studies of operationally-focused safety compliance or with the broader range of activities specified in regulations, standards and guidelines which also demand compliance. Some of the latter may be covered in other academic studies of safety participation, safety consciousness and safety citizenship (Table 4).

5.4 Future Research

From the evidence collated here existing studies of safety leadership for safety compliance construe both constructs narrowly. Moreover, the particular contexts and the specific relationships investigated are also limited. Similarly the methods used to examine safety leadership are also restricted. Each of these observations provides an opportunity to expand the study of safety leadership for safety compliance.

Expanding the view of compliance and leadership

We contend that safety compliance has been narrowly focused in the academic literature and that this needs to be broadened to reflect practice. In addition existing studies of safety compliance (including safety participation, safety citizenship and safety consciousness) suggest implicitly that compliance is a binary state: either it has been achieved or it has not. The role of the safety leader is to ensure compliance. In practice of course safety is not static but rather a dynamic on-going process, needing continual intervention. Gray and Silbey (2011) note that "compliance as a process evolves among countless transactions across a heterogeneous set of compliance agents, with varying degrees of agency, knowledge, hierarchy, autonomy and experience, pg 134". Their observation also indicates that compliance is not the sole responsibility of one individual – the safety leader, but rather a collaborative endeavour which requires collective leadership, because of variation in context and diversity in actor abilities and engagement with risk and so safety. Safety compliance is therefore a dynamic process that requires collective rather than individual responsibility.

All of the studies in this review of safety leadership and leadership practices to achieve safety compliance adopted a unitary view of the leader as an individual. More recent reviews of the general leadership literature (e.g. Thorpe et al., 2011) consider that leadership skills and responsibilities can be dispersed throughout an organization. Such perspectives are described as 'plural leadership' (Denis et al., 2012). One particular form of 'plural leadership' embraces the work on distributed leadership (Fitzsimmons et al., 2011), where leadership roles are dispersed across organizational levels over time, so that multiple actors take on leadership roles at appropriate moments exerting influence jointly. Adopting such a distributed perspective on safety leadership would accommodate the need for collective responsibility and accountability for safety compliance by drawing on the diverse skills, knowledge, expertise and experience within an organization to develop policies, practices and procedures that ensure safety compliance while remaining relevant and viable. This enhances the possibility of greater employee buy-in and increases the chance of success in achieving safety compliance. This moves away from the traditional psychological approach to safety leadership and points towards a more relational approach to safety leadership that also gives consideration to context, which has been absent in studies hitherto. This gives credence to the notion of 'relational regulation' (Huising and Silbey, 2011), which encourages a contextually-sensitive alternative model of safety

leadership for safety compliance. 'Relational regulation' is a collaborative endeavour that suggests how individuals may more effectively engage with many others to develop practices, procedures and policies that are locally relevant, pragmatic and more effective because others have been involved in their development. Safety leadership that involves others encourages more widespread adoption and deployment of safe practices in the organization. This enhances safety compliance.

Opportunities for empirical work

Much work has focused on supervisor-front-line worker relationships. Other relationships in the organization have been less frequently studied. This is surprising given the significance attached in regulatory guidance notices (HSE, 1991; HSE, 2002; HSE, 2009) to the role of senior managers in championing safety in organizations. How they influence the safety compliance of their direct reports (i.e. other senior and middle managers) and also those more distally connected to them (e.g. Hill et al., 2012) needs more empirical investigation. Such a focus on supervisor-front-line workers emphasizes the importance of safety compliance by blue-collar workers, and ignores the need for safety compliance by professionals, or white collar workers. Following Mintzberg's (1983) distinction between standardization of processes or outputs, which might typically impact the coordination of the work of blue collar workers, and standardization of inputs through training and affiliation of professional bodies, which influences the work coordination of white collar workers more strongly, it might be assumed that different safety leadership practices are required to achieve safety compliance with these different groups of workers. This remains to be investigated.

Safety studies have typically focused on organizations operating in high hazard settings (e.g. oil and gas, construction and manufacturing industries) (Table 5). Evidently this is a limited sample, and there are many other industrial sectors with different organizational forms that merit investigation. Safety leadership in low hazard settings, such as office and retail, where safety might be perceived to be less important because accidents are less catastrophic may be more problematic. How safety leaders influence others to ensure compliance in these settings has been under-researched, even though a majority of the workforce in developed countries works in these (typically service sector) environments (see Office for National Statistics, 2013 for UK data), which are nevertheless prone to accidents categorised as "slips, trips and falls".

As noted above organizations in existing studies are hierarchical, and when strictly enforced this may make employee participation less likely, as Bhattacharya and Tang (2013) showed in the shipping industry. In flatter organizational structures or in organizations like accountancy or legal firms where there may be several partners and status differentials may be smaller it is unclear who the safety leaders are and how leadership is enacted. It is also notable that with the exception of Mullen and Kelloway (2009) all of the other studies in this review investigated safety leadership in private sector

organizations. How safety leadership is enacted in public sector organizations has not been examined, and yet we know that the pressures faced by leaders in public sector organizations differ from those faced by leaders in private sector organizations (Doyle et al., 2000). These pressures may influence the priority afforded to safety in these contrasting environments and so the nature of leadership for safety compliance.

Alternative methods of study

The majority of studies investigating safety leadership have utilized existing measures of leadership behaviour (MLQ and LMX). These scales provide a quantitative assessment of the leaders' behaviour from the perspective of the follower (in this case the employee). Clearly this limits our understanding of safety leadership, not only because it relies on both a pre-determined articulation of leader behaviours which may not be applicable always and a retrospective, and necessarily subjective, perception of employees to describe leader behaviours, but also because it is often de-contextualised. Methods therefore (i) that focus directly rather than indirectly on the leader and their actions and understanding of leadership, (ii) that examine leadership 'in the moment' and (iii) that take account of context, including relationships with others, may provide deeper insights into the enactment of safety leadership. There are a number of possibilities that merit attention. Three of them are considered below.

Safety Leadership behaviours have been inferred from the reports given by subordinates through quantitative survey instruments (Table 5). It is much less common to investigate the understanding of safety leaders directly, although the small-scale study of leaders' meanings by Fruhen et al. (2013) is an exception. Using both content and linguistic analysis they interrogated eight transcripts of senior manager to understand their underlying attitudes to safety and how this influences their actions. Future studies, perhaps adopting Weick's (1993) sense-making approach, could investigate how safety leaders make sense of their context and how this influences their sense-giving activities to their followers.

The use of a 'critical incident technique' facilitates the investigation of significant events from the perspective of the individual involved (in this case the safety leader), taking into account affective, behavioural and cognitive elements (Chell, 2004). The focus of the interview is a particular event or incident that has salience to the individual which seeks to explain first what happened and why and then how it was managed and what the outcome was. Collating evidence across multiple incidents allows common themes to emerge and reveals patterns of activity. Leadership tactics and practices for handling safety-related events could be identified from this analysis.

Observation of individual leader practices in the workplace, for example through participant observation (Waddington, 2004) would give greater insight into actual practices and their contingent relationships on context and employee engagement. Such a technique could form part of a wider ethnographic approach to studying safety leadership which would combine different methods to permit the study of people in their natural settings, allowing the capture of social meanings and ordinary activities (Brewer, 2000). In doing so the informal organizational rules, tacit knowledge and discretionary activity that underpins the particular practices of safety leadership would be surfaced. These are currently poorly understood.

6. CONCLUSIONS

This paper demonstrates that academic studies have not investigated the full range of practices that are deployed in practice by organizations to ensure safety compliance. The selection of sample population, typically of supervisors and front-line workers, ensures that safety compliance focused mainly on implementation and operations. Moreover, the adoption of existing leadership scales narrows the focus of safety leadership to individuals, and it must be inferred that they use either intrinsic or extrinsic motivations congruent with their leadership style. From these observations we suggest first that safety compliance should be conceptualized more broadly to conform closely to the requirements of OSH management systems, and second that other perspectives on leadership beyond the transformational-transactional such as distributed leadership could be deployed to investigate safety leadership for compliance. We also suggest that safety leadership research has generally not taken account of context, and note a range of alternative contexts that have not been investigated but which will nevertheless impact safety leadership. Moreover other perspectives on safety leadership than those determined from the results of follower perceptions will be captured by adopting methods other than quantitative surveys of leadership behaviour. We suggest a number of alternatives that will enrich our understanding of safety leadership and which consequently may improve safety compliance.

ACKNOWLEDGEMENTS

We acknowledge the receipt of research funding from the Institution of Occupational Safety and Health (IOSH) under their programme of research “Health and Safety in a changing world”. The views expressed in this paper are not necessarily those of IOSH. We thank participants at WOSNET2015 in Porto and an anonymous reviewer for helpful comments on earlier versions of this paper.

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Table 1. Keywords used to create search strings

Main Term	Additional Terms
Safety	safety OR security OR sure* OR safeguard OR protect* OR reliab* OR resilien*
Leadership	leader* OR manage* OR advisor OR director OR supervisor OR facilitator OR officer OR superintendent OR chief OR commander OR expert OR coach OR specialist
Practice	practi?e OR activity OR action OR role OR function OR skill OR enact OR do OR conduct OR routine

Table 2. Number of items discovered by applying a search string to an electronic database. Number of relevant titles are in parenthesis.

	Database				
Search String	**ABI**	**EBSCO**	**SCOPUS**	**Science Direct**	**PsychInfo**
Safety + Leadership	1192	1169	6486	1949	577
Safety + Practice	1263	1533	20425	6124	2250
Safety + Leadership + Practice	90 (12)	100 (21)	480 (37)	134 (18)	66 (24)

Table 3. Four ideal-types of organizational culture and their characteristics (Derived from Denison and Spreitzer, 1991).

Ideal-type	**Emphasis**	**Purpose**	**Motivation**	**Leadership Behaviours**
Group	Flexibility (internal)	Group maintenance	Cohesion, Membership	Participative, Considerate, Supportive
Developmental	Flexibility (external)	Growth and Adaptation	Creativity, Variety	Entrepreneurial, Visionary
Rational	Productivity, Performance	Attainment of objectives	Competition	Directive, Instrumental
Hierarchical	Efficiency (internal), Coordination	Execution of regulations	Control	Conservative, Cautious

Table 4. Compliance focus of different scales used to measure impact of leadership aligned to requirements of Occupational Health and Safety Management System (BSI, 2007).

Author	Safety Compliance (Neal and Griffin, 2006[a]; Dahl and Olsen, 2013[b]; Fernández-Muñiz et al., 2014[c]; Yagil and Luria, 2010[d])	Safety Participation (Neal and Griffin, 2006[a]; Clarke and Ward, 2006[b]; Fernández-Muñiz et al., 2014[c]; Griffin and Hu, 2013[d])	Safety Consciousness (Barling et al., 2002)	Safety Citizenship (Hofmann et al., 2003)	Safety Communication (Hofmann and Morgeson, 1999)	Risk Management (Fernández-Muñiz et al., 2014)	Motivation / Policy / Concern (Lu and Yang, 2010)	Safety interventions (Luria, Zohar and Erev, 2008; Zohar, 2002b; Zohar and Luria, 2003)	Ascribed practices of the leader
1. General requirements									
2. OH&S policy						**X**	**X**		
3. Planning									
3.1Hazard identification/ Risk assessment/ determining controls	**X[a]X[b]**	**X[a,b]**		**X**		**X**		**X**	**Identifying hazards/ Assessing risks**
3.2 Legal &other requirements									
3.3 Objectives and programmes									
4. Implementation & operation									
4.1 Resources, roles, responsibility, accountability & authority	**X[a,b,c,d]**		**X**			**X**	**X**	**X**	**Providing resources / Clarifying roles**
4.2 Competence / Training /Awareness	**X[b]**	**X[a]**	**X**	**X**		**X**	**X**		**Training**
4.3 Communication / Participation & consultation									
4.3.1 Communication	**X[b,c,d]**	**X[a,b,c,d]**	**X**	**X**	**X**	**X**	**X**		**Communicating**

4.3.2 Participation & consultation	**X[b]**	**X[a,d]**	**X**		**X**	**X**	**X**		**Encouraging participation / Consulting**
4.4 Documentation									
4.5 Control of Documents									
4.6 Operational Control	**X[a,b,c]**			**X**		**X**	**X**	**X**	**Controlling operations / Writing procedures**
4.7 Emergency preparedness & response			**X**			**X**			**Preparing for emergencies**
5. Checking									
5.1 Performance measurement & monitoring	**X[b,c]**			**X**		**X**	**X**		**Measuring performance**
5.2 Evaluation of compliance		**X[c]**				**X**			**Evaluating compliance**
5.3 Investigate accidents / non-conformity / Corrective action & preventive action									
5.3.1 Incident investigation	**X[d]**	**X[d]**	**X**	**X**		**X**			**Investigating incidents**
5.3.2 Nonconformity, corrective action and preventive action	**X[b]**	**X[d]**		**X**					**Investigating non-compliance**
5.4 Control of records									
5.5 Internal audit		**X[b]**					**X**		**Auditing**
6. Management Review									

Table 5. Data extracted from empirical studies of safety leadership identified by a systematic literature review. Asterisked items were identified in the initial screen.

Author	**Country/Industry**	**Culture (*dominant ideal-types*)**	**People/Composition** *Demographics*	*Capability (experience in role)*	**Processes (*mode of governance; standardization; type of technology)***	**Structure of organization** *Size/Shape – formalization/ centralization*	*Hierarchical level of leader-follower dyad*	**Behavioural focus/ Measure of Leadership** (as proxies for practices and leadership styles)
Barling et al. (2002)	Canada. Food & beverage industry	Rational	*Study 1*: 64% male. Avg. age 26.8 yrs Part-time workers *Study 2*: 49% female. Avg. age 19.5 yrs. Part-time workers	*Study 1*:Avg. 3.1 yrs in role *Study 2*: Avg. 7 months in role	Command and control. Customer service. Lack of job security.	Low job control/autonomy	Supervisor + Front-line worker	Safety Consciousness / MLQ
*Clarke and Ward (2006)	UK. Manufacturing	Rational/ Hierarchical	95% male. Avg. age 44.7 yrs	Avg. 24 yrs	Hierarchy. Highly standardized processes. Technical	Formalized processes.	Supervisor + Front-line worker	Safety Participation / Bespoke measure of leader influence
*Conchie and Donald (2009)	UK. Construction	Rational/ Hierarchical	100% male. Front-line workers Avg. age 36.8 yrs	Front-line workers: Avg. 16.8 yrs Supervisors: Avg. 23.4 yrs	Trust focus of study (governance).	Formalized. Team working – project focus	Supervisor + Front-line worker. Avg. span of control – 11 men.	Safety Citizenship / MLQ
*Conchie et al. (2012)	UK. Oil Company	Rational/ Hierarchical	100% male. Avg. age 40 yrs.	Front-line workers: Avg. 10.3 yrs Supervisors: Avg. 20.4 yrs	Technical Trust focus of study (governance). Highly standardized.	Formalized and centralized	Supervisor + Front-line worker. Avg. span of control – 8 men.	Safety Citizenship / MLQ
Conchie et al. (2013)	UK. Construction	Rational/ Hierarchical	68 males + 1 female.	Avg. 9 yrs	Hierarchy.	Sub-contractors. Project focus. Centralized.	Supervisor + Operatives	Safety Leadership Behaviours / Job Demands-Resources Framework (focus groups)
Credo et al. (2010)	USA. Drilling Company	Rational	n/a	n/a	Hierarchy. Standardized – with local adaptations. Technical	80k employees in 80 countries – MNC. Decentralized – local operations varied.	Managers + Supervisors / Front-line worker	Safety Consciousness / LMX

*Dahl and Olsen (2013)	Norway. Oil Company	Rational	88% male. Avg. age: 50% over 45yrs	n/a	Standardized processes. Technical.	28 platforms. 10k respondents. Formalized and centralized	Leader + workers	Safety Compliance / Bespoke scale
Fernández-Muñiz et al. (2014)	Spain. Manufacturing, Construction and Services	n/a	n/a	n/a	n/a	SME focus (73.4%)	Safety Managers	Safety Compliance-Safety Participation / Risk Management / Bespoke scale for leadership
Griffin and Hu (2013)	Multiple sectors: Clerical/Admin, Professional.	n/a. (Bureaucratic) Services	51% male. Age 18-65 yrs	45.7% with employer > 7yrs	n/a	n/a	Supervisors + subordinates	Safety compliance-participation / Bespoke scale for leadership
Hoffmeister et al. (2014)	USA. Construction Company	Rational	96.8% males. Avg. age 35 yrs.	Avg. 3yrs.	Hierarchy. "construction is dynamic and complex, pg. 71".	Team-working. Mentorship model of training.	Journeymen + apprentices	Safety Compliance - Participation / – MLQ
*Hofmann and Morgeson (1999)	USA. Manufacturing	Rational	88% males. Avg. age 50.8 yrs.	Avg. 26.2 yrs. 4yrs in role.	Standardized processes. Technical.	1200 employees in 64 work groups. Team working.	Group leader + supervisor / front-line worker	Safety Communication / LMX
Hofmann et al. (2003)	USA. Army transport team	Hierarchical	82% male. Members: Avg. age 26yrs. Team Leaders: Avg. age 31.5yrs	Members: Tenure 6 yrs, in unit 4.2 yrs. Leaders: Tenure 10.4 yrs, in unit 4.5 yrs.	Hierarchy. Standardized.	Centralized. Formalized. Team working.	Leaders + team members	Safety Citizenship /LMX
Innes et al. (2010)	USA. Range of industries	n/a	47% male. Avg. age 37.4yrs.	n/a	n/a	n/a	Supervisor + Front-line worker	Safety Compliance / Participation / MLQ
*Kapp (2012)	USA. Construction and Manufacturing	Rational	90% male. Avg. age 46yrs	n/a	Hierarchy. Standardized.	Team working (groups/shifts) Formalized	Supervisor + Front-line worker	Safety Compliance / Participation /MLQ
Kath et al. (2010)	USA. Railway maintenance	Hierarchical	Avg. age 46-50yrs	Tenure: avg. 21-30 yrs	Hieraarchy. Standardized.	Large Rail company. Centralized. Formal	Supervisor + Front-line worker	Safety Communication / LMX
Kelloway et al. (2006)	Canada. Service sector	n/a	>60% female. Avg. age 21.6 yrs	Tenure: avg. 18 months	n/a	n/a	Supervisor + Front-line worker	Safety Consciousness / MLQ
de Koster et al. (2011)	The Netherlands. Warehousing in	Rational	88% males. Avg. age c.40yrs.		Standardized process.		Manager + employee.	Safety consciousness / MLQ

	different sectors.						Average span 13 people.	
Lu and Yang (2010)	China. Container terminals	Rational	72% between 31 and 50 yrs.		Hierarchy.		Senior Manager + worker	Safety Compliance - Participation / bespoke scale
Luria et al. (2008)	Israel. Manufacturing	n/a	75% male. Avg. age 32	Avg. Tenure 6yrs	Standardized processes.	Formalized	Supervisor + Front-line worker	Supervisory feedback + Worker use of PPE / Supervisory feedback
Michael et al. (2006)	USA. Wood product manufacturing	Rational	80% males. Avg. age 38.	n/a	Standardized processes.		Supervisor + Front-line worker	Safety Communication / LMX
Mullen and Kelloway (2009)	Canada. Hospitals	Hierarchical	Managers: >80% female Avg. age 48-50. Workers: >90% female Avg. age 43/ 44 yrs	Managers: Tenure avg. 9.5-10.5 yrs Workers: Tenure avg. 10-11 yrs.	Standard procedures. Dynamic and complex		Manager + employees	Safety Compliance- Participation /MLQ
Yagil and Luria (2010)	Israel. Manufacturing	Rational	>90% male. Avg. age 38.8 yrs Employed: avg. 10.5 yrs	n/a	Standardized procedures.	Formalized	Manager + employees	Safety Compliance / LMX
Zohar (2002a)	Israel. Metal processing for military	Rational/ Hierarchical	All male. Avg. age 39.2 yrs	Avg. tenure 7.9 yrs	Standardized procedures.	Centralized. Work groups	Supervisor employees	Safety Climate /MLQ
*Zohar (2002b)	Israel. Maintenance of heavy equipment	n/a	All males. Avg. age 38.7 yrs (employees) Avg. age 44.9 yrs (supervisor)	Avg. tenure 6.6 yrs (employees) Avg. tenure 13.6 yrs (supervisor)	Standardized procedures.	Centralized. Work groups	Supervisor + Front-line worker	Worker use of PPE /Supervisory feedback on safety
Zohar and Luria (2003)	Israel. Oil Refinery + Processing Industries	Rational	Oil. All males. Avg. age 33.9 yrs (employees) Avg. age 44.2 yrs (supervisor)	Oil. Avg. tenure 6.1 yrs (employees) Avg. tenure 10.4 yrs (supervisor)	Standardized procedures. Technical.	Centralized. Hierarchical.	Supervisor + Front-line worker	Supervisory feedback + Worker use of PPE / Supervisory feedback